

-
- UDs**

☒ **Class**
- Default page(s):
☒ **Highlight all items only**
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display$4 and cluster$3 near10
highlight$3 and (node$ or tree$1 or
leaves)

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 BRS form
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  Image
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  HTML

|    | U | I | Document ID   | Issue Date | Pages | Title                                                   | Current OR | Current XRef         | Re |
|----|---|---|---------------|------------|-------|---------------------------------------------------------|------------|----------------------|----|
| 16 | P | I | US 6185639 B1 | 20010206   |       | System and method to reduce a computer system's         | 710/48     | 710/263;<br>710/5    |    |
| 17 | P | I | US 6151595 A  | 20001121   |       | Methods for interactive visualization of spreading      | 707/1      | 345/589;<br>707/27   |    |
| 18 | P | I | US 6111255 A  | 20000829   |       | Methods of screening for a tumor or tumor progression   | 250/339.12 | 250/339.08           |    |
| 19 | P | I | US 6049793 A  | 20000411   |       | System for building an artificial neural network        | 706/17     | 706/20               |    |
| 20 | P | I | US 5945675 A  | 19990831   |       | Methods of screening for a tumor or tumor progression   | 250/339.12 | 250/339.08           |    |
| 21 | P | I | US 5574837 A  | 19961112   |       | Method of generating a browser interface for            | 345/440    |                      |    |
| 22 | P | I | US 5339390 A  | 19940816   | 21    | Operating a processor to display stretched              | 345/782    | 345/848              |    |
| 23 | P | I | US 4959802 A  | 19900925   |       | Video bus for a vision system                           | 701/1      | 901/46               |    |
| 24 | P | I | US 4706120 A  | 19871110   |       | Modular, vision system for automation of inspection and | 348/114    | 180/168;<br>180/169; |    |
| 25 | P | I | US PP04025 P  | 19770322   |       | Rose plant                                              | PLT/121    |                      |    |

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| Search                                                                                        | <input type="text"/>                                                                     | Reset | Quit | Done |
| File                                                                                          | REPEAT USE PGMR, FPN, JPT, DEF <input checked="" type="checkbox"/> More:                 |       |      |      |
| Default operator                                                                              | <input type="checkbox"/> OR <input checked="" type="checkbox"/> Highlight all terms only |       |      |      |
| <pre> display\$4 and cluster\$3 near10 highlight\$3 and (mode\$ or tree\$1 or leaves ) </pre> |                                                                                          |       |      |      |

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 **IRS Form**
 **State of Maryland**
 **County of Prince George's**
 **City of Bowie**
 **City of Gaithersburg**

|    | U | L | Document ID   | Issue Date | Pages | Title                                                    | Current OR | Current XRef         | Re |
|----|---|---|---------------|------------|-------|----------------------------------------------------------|------------|----------------------|----|
| 11 | P | F | US 6252597 B1 | 20010626   |       | Scalable user interface for graphically representing     | 345/841    | 345/854              |    |
| 12 | P | F | US 6226408 B1 | 20010501   |       | Unsupervised identification of nonlinear data cluster in | 382/224    | 382/156;<br>382/197; |    |
| 13 | P | F | US 6219727 B1 | 20010417   |       | Apparatus and method for computer host system and        | 710/48     | 709/321;<br>710/1;   |    |
| 14 | P | F | US 6216228 B1 | 20010410   |       | Controlling video or image presentation according to     | 713/176    | 380/206;<br>380/239; |    |
| 15 | P | F | US 6214550 B1 | 20010410   | 53    | Methods of differentiating metastatic and                | 435/6      | 435/4;<br>436/501    |    |
| 16 | P | F | US 6185639 B1 | 20010206   |       | System and method to reduce a computer system's          | 710/48     | 710/263;<br>710/5    |    |
| 17 | P | F | US 6151595 A  | 20001121   |       | Methods for interactive visualization of spreading       | 707/1      | 345/589;<br>707/2;   |    |
| 18 | P | F | US 6111255 A  | 20000829   |       | Methods of screening for a tumor or tumor progression    | 250/339.12 | 250/339.08           |    |
| 19 | P | F | US 6049793 A  | 20000411   |       | System for building an artificial neural network         | 706/17     | 706/20               |    |
| 20 | P | F | US 5945675 A  | 19990831   |       | Methods of screening for a tumor or tumor progression    | 250/339.12 | 250/339.08           |    |
| 21 | P | F | US 5574837 A  | 19961112   |       | Method of generating a                                   | 345/440    |                      |    |

 Hits
  Details
  HTML

ID# REPAT US PGMR FPD IPT EFF ☒ Date:

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leaves$1

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| ● 日期 | ● 星期 | ● 姓名 | ● 性别 | ● 年龄 |
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|    | U | I | Document ID              | Issue Date | Pages | Title                                                 | Current OR         | Current XRef                            | Re |
|----|---|---|--------------------------|------------|-------|-------------------------------------------------------|--------------------|-----------------------------------------|----|
| 1  | F | F | US 20020099295 A1        | 20020725   | 60    | System and method for functional brain mapping and    | 600/476            | 382/128;<br>600/323                     |    |
| 2  | F | F | US 20020091680 A1        | 20020711   |       | Knowledge pattern integration system                  | 707/3              |                                         |    |
| 3  | F | F | US 20020067360 A1        | 20020606   |       | USAGE BASED METHODS OF TRAVERSING AND DISPLAYING      | 345/441            |                                         |    |
| 4  | F | F | US 20020052692 A1        | 20020502   |       | COMPUTER SYSTEMS AND METHODS FOR HIERARCHICAL CLUSTER | 702/19             | 422/68.1;<br>707/108                    |    |
| 5  | F | F | US 20020049542 A1        | 20020425   |       | GENE DISCOVERY THROUGH COMPARISONS OF NETWORKS OF     | 702/19             | 435/6;<br>702/20                        |    |
| 6  | F | F | US 20010030769 A1        | 20011018   | 10    | Apparatus and method for halftone hybrid screen       | 358/2.1            | 358/3.06;<br>358/3.21                   |    |
| 7  | F | F | US 20010000150 A1        | 20010405   | 43    | Methods of differentiating metastatic and             | 435/6              |                                         |    |
| 8  | F | F | US <del>6369819</del> B1 | 20020409   |       | Methods for visualizing transformations among         | <del>345/440</del> | <del>345/853;</del><br><del>707/3</del> |    |
| 9  | F | F | US 6355782 B1            | 20020312   |       | Hypohidrotic ectodermal dysplasia genes and proteins  | 530/399            | 530/350                                 |    |
| 10 | F | F | US 6252675 B1            | 20010626   | 9     | Apparatus and method for halftone hybrid screen       | 358/1.9            | 382/237                                 |    |
| 11 |   |   | US 6252597 B1            | 20010626   |       | Scalable user interface for                           | 345/841            | 345/854                                 |    |



 Details





- ☒ L176: (3) (space or surface) adj2 map\$5 and high adj2
- ☒ L43: (18) 8 and centroids
- ☒ L183: (18) 8 and centroids and vector
- ☒ L190: (329) surface adj3 (map\$5 or detail) and vector
- ☒ L197: (35) surface adj3 (map\$5 or detail) and vector
- ☒ L218: (2) surface adj3 (map\$5 or detail) and vector
- ☒ L211: (4) surface adj3 (map\$5 or detail) and vector
- ☒ L204: (8) surface adj3 (map\$5 or detail) and vector

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Search    DBs: USPAT:US:RGPUB:EPD:JPO:DEF ☒ PluralsDefault operator: OR ☒ Highlight all hit terms initially

surface adj3 (map\$5 or detail) and  
vector and projection and cluster\$3  
and centroid\$

|   | U                                   | 1                                   | Document ID   | Issue Date | Pages | Title                                                | Current OR | Current XRef         | Ret |
|---|-------------------------------------|-------------------------------------|---------------|------------|-------|------------------------------------------------------|------------|----------------------|-----|
| 1 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | US 6278799 B1 | 20010821   | 44    | Hierarchical data matrix pattern recognition system  | 382/159    | 382/155;<br>382/156; |     |
| 2 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | US 6035057 A  | 20000307   | 43    | Hierarchical data matrix pattern recognition and     | 382/159    | 382/155;<br>382/156  |     |
| 3 | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | US 5836872 A  | 19981117   | 19    | Digital optical visualization, enhancement,          | 600/306    | 382/128              |     |
| 4 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | US 5592599 A  | 19970107   | 62    | Video special effects system with graphical operator | 345/427    | 345/649;<br>345/722  |     |
| 5 | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | US 5519618 A  | 19960521   | 76    | Airport surface safety logic                         | 701/120    | 701/301              |     |
| 6 | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | US 5374932 A  | 19941220   | 78    | Airport surface surveillance system                  | 342/36     | 342/29;<br>342/39;   |     |
| 7 | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | US 5067085 A  | 19911119   |       | Optical robotic canopy polishing system              | 700/164    | 451/5;<br>451/6;     |     |
| 8 | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | US 5016173 A  | 19910514   | 16    | Apparatus and method for monitoring visually         | 382/128    | 382/165;<br>382/190; |     |



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The screenshot shows a web-based search interface. At the top, there are buttons for 'Search', 'Link', 'Browse', 'Queue', and 'Clear'. Below these, a search criteria box contains the text 'USPAT; US-PGPUB; EPO; JPO; DEF' followed by a checked checkbox and the word 'Plurals'. To the left of this box is a 'DB:' label. Below the search criteria, there is a 'Default operator' dropdown menu set to 'OR' and another checked checkbox labeled 'Highlight all hit terms initially'. The main display area shows the results '557 and 559'. At the bottom, there is a toolbar with icons and labels for 'BRS form', 'B&B form', 'Image', 'Text', and 'HTML'.

|   | U                                   | 1                                   | Document ID   | Issue Date | Pages | Title                                                    | Current OR | Current XRef         | Ret |
|---|-------------------------------------|-------------------------------------|---------------|------------|-------|----------------------------------------------------------|------------|----------------------|-----|
| 1 | <input type="checkbox"/>            | <input type="checkbox"/>            | US 6327574 B1 | 20011204   | 39    | Hierarchical models of consumer attributes for           | 705/14     | 705/10;<br>705/26    |     |
| 2 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | US 6289353 B1 | 20010911   | 41    | Intelligent query system for automatically indexing in a | 707/102    | 707/101;<br>707/3    |     |
| 3 | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | US 6269368 B1 | 20010731   | 20    | Information retrieval using dynamic evidence combination | 707/6      | 707/3;<br>707/4;     |     |
| 4 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | US 5974412 A  | 19991026   | 43    | Intelligent query system for automatically indexing      | 707/3      | 707/10;<br>707/102   |     |
| 5 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | US 5794178 A  | 19980811   | 45    | Visualization of information using graphical             | 704/9      | 345/440;<br>345/839; |     |



☒ L260: (0) 253 and 1  
☒ L267: (1) 253 and 57  
☒ L274: (7) 1 and genetic and cluster\$4  
☒ L281: (8) 1 and (gene or dna or protein or genetic) a  
☒ L288: (0) 1 and (gene or dna or protein or genetic) a  
☒ L295: (4) 1 and (gene or dna or protein or genetic) a  
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☒ (0) 1 and cluster\$3 and algorithm and user and (in

Search List Browse Queue Clear

DB: USPAT:US-PGPUB:EPO:JPO:DEF ☒ Plurals

Default operator: OR ☒ Highlight all hit terms initially

1 and (gene or dna or protein or genetic) and cluster\$4

☒ BRS term ☒ IS&R term ☒ Image ☒ Text ☒ HTML

| U                                   | I                        | Document ID            | Issue Date | Pages | Title                                                    | Current OR | Current XRef          | Ret |
|-------------------------------------|--------------------------|------------------------|------------|-------|----------------------------------------------------------|------------|-----------------------|-----|
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | US 6301579 <b>(41)</b> | 20011009   | 46    | Method, system, and computer program product for         | 707/102    | 345/440;<br>707/104.1 |     |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | US 6289353 B1          | 20010911   | 41    | Intelligent query system for automatically indexing in a | 707/102    | 707/101;<br>707/3     |     |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | US 6289337 B1          | 20010911   | 14    | Method and system for accessing information using        | 707/3      | 707/10;<br>707/103R;  |     |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | US 6269325 B1          | 20010731   | 13    | Visual presentation technique for data mining            | 703/2      | 345/440;<br>703/22;   |     |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | US 5974412 A           | 19991026   | 43    | Intelligent query system for automatically indexing      | 707/3      | 707/10;<br>707/102    |     |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | US 5884282 A           | 19990316   | 31    | Automated collaborative filtering system                 | 705/27     | 705/12;<br>705/26;    |     |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | US 5835085 A           | 19981110   | 13    | Graphical display of relationships                       | 345/853    | 345/440               |     |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | US 5596703 A           | 19970121   | 14    | Graphical display of relationships                       | 345/700    | 345/440               |     |



- L323: (7) 57 and (gene or dna or protein or genetic)
- L337: (84) cluster and 1
- L344: (33) cluster and 64
- L351: (426) cluster and 50
- L358: (706) cluster and 57
- L365: (1146) cluster and 382/\$.cccls.
- L372: (3) cluster and 382/\$.cccls. and 351 and 353
- L379: (80) 702/20 and genetic
- L386: (16) 1 and genetic
- L393: (0) 1 and genetic and 379
- L400: (8) 1 and genetic and 345/\$.cccls.

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DBs: USPAT, US-PGPUB, EPO, JPO, DEF ☒ Plurals

Default operator: OR

☒ Highlight all hit terms initially

1 and genetic and 345/\$.cccls.

☒ BRS form ☒ ISIR form ☒ Image ☒ Text ☒ HTML

|                                     | U                                   | I | Document ID   | Issue Date | Pages | Title                                                   | Current OR | Current XRef          | Ret |
|-------------------------------------|-------------------------------------|---|---------------|------------|-------|---------------------------------------------------------|------------|-----------------------|-----|
| <input checked="" type="checkbox"/> | <input type="checkbox"/>            |   | US 6304262 B1 | 20011016   | 16    | Information security analysis system                    | 345/418    |                       |     |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |   | US 6269325 B1 | 20010731   | 13    | Visual presentation technique for data mining           | 703/2      | 345/440;<br>703/22;   |     |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |   | US 6074831 A  | 20000613   | 15    | Partitioning of polymorphic DNAs                        | 435/6      | 345/440;<br>435/91.1; |     |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |   | US 5835085 A  | 19981110   | 13    | Graphical display of relationships                      | 345/853    | 345/440               |     |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |   | US 5596703 A  | 19970121   | 14    | Graphical display of relationships                      | 345/700    | 345/440               |     |
| <input checked="" type="checkbox"/> | <input type="checkbox"/>            |   | US 5586052 A  | 19961217   | 16    | Rule based apparatus and method for evaluating an       | 703/1      | 345/440;<br>700/182;  |     |
| <input checked="" type="checkbox"/> | <input type="checkbox"/>            |   | US 5511158 A  | 19960423   | 13    | System and method for creating and evolving             | 345/440    | 345/419;<br>345/420;  |     |
| <input checked="" type="checkbox"/> | <input type="checkbox"/>            |   | US 5510995 A  | 19960423   | 26    | Sculptured surface synthesis based on functional design | 700/182    | 345/419;<br>345/440   |     |



EAST - [9408716.wsp:1]

File View Edit Tools Window Help

☒ L50: (28) 8 and clusters  
☒ L57: (16) 43 and 50  
☒ L64: (8) 43 and 50 and surface  
☒ L71: (15) 43 and 50 and detail\$3  
☒ L78: (8) 43 and 50 and map\$5  
☒ L85: (8) 64 and 71  
☒ L92: (5) 64 and 78

☐ Failed

Search      
 DBs: ☒ USPAT ☒ US:PGPUB ☒ EPO ☒ JPO ☒ DEF ☒ Plurals  
 Default operator: ☐ AND ☒ OR ☒ Highlight all hit terms initially

64 and 78

|   | U                                   | 1                                   | Document ID    | Issue Date | Pages | Title                                               | Current OR | Current XRef         | Ret |
|---|-------------------------------------|-------------------------------------|----------------|------------|-------|-----------------------------------------------------|------------|----------------------|-----|
| 1 | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | US 6278799 B1  | 20010821   | 44    | Hierarchical data matrix pattern recognition system | 382/159    | 382/155;<br>382/156; |     |
| 2 | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | US 6035057 A   | 20000307   | 43    | Hierarchical data matrix pattern recognition and    | 382/159    | 382/155;<br>382/156  |     |
| 3 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | US 5794178 (A) | 19980811   | 45    | Visualization of information using graphical        | 704/9      | 345/440;<br>345/839; |     |
| 4 | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | US 5675819 A   | 19971007   | 29    | Document information retrieval using global word    | 704/10     | 704/9;<br>707/3;     |     |
| 5 | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | US 5619709 A   | 19970408   | 45    | System and method of context vector generation and  | 707/532    | 704/9;<br>707/2      |     |



L239: (80) 702/20 and genetic  
 L246: (15) 232 and 239  
 L253: (133) 232 or 239  
 L260: (0) 253 and 1  
 L267: (1) 253 and 57  
 L274: (7) 1 and genetic and cluster\$4

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(0) 1 and cluster\$3 and algorithm and user and (in

Search List Browse Queue Clear

DB: USPAT:US:PGPUB:EPD:JPD:DEF ☒ Parals

Default operator OR

☒ Highlight all hit terms initially

1 and genetic and cluster\$4

BRS form

ISAR form

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Text

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|                                     | U                        | I | Document ID   | Issue Date | Pages | Title                                                    | Current OR | Current XRef         | Ret |
|-------------------------------------|--------------------------|---|---------------|------------|-------|----------------------------------------------------------|------------|----------------------|-----|
| <input checked="" type="checkbox"/> | <input type="checkbox"/> |   | US 6289353 B1 | 20010911   | 41    | Intelligent query system for automatically indexing in a | 707/102    | 707/101;<br>707/3    |     |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> |   | US 6289337 B1 | 20010911   | 14    | Method and system for accessing information using        | 707/3      | 707/10;<br>707/103R; |     |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> |   | US 6269325 B1 | 20010731   | 13    | Visual presentation technique for data mining            | 703/2      | 345/440;<br>703/22;  |     |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> |   | US 5974412 A  | 19991026   | 43    | Intelligent query system for automatically indexing      | 707/3      | 707/10;<br>707/102   |     |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> |   | US 5884282 A  | 19990316   | 31    | Automated collaborative filtering system                 | 705/27     | 705/12;<br>705/26;   |     |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> |   | US 5835085 A  | 19981110   | 13    | Graphical display of relationships                       | 345/853    | 345/440              |     |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> |   | US 5596703 A  | 19970121   | 14    | Graphical display of relationships                       | 345/700    | 345/440              |     |



L260: (0) 253 and 1  
 L267: (1) 253 and 57  
 L274: (7) 1 and genetic and cluster\$4  
 L281: (8) 1 and (gene or dna or protein or genetic) a  
 L288: (0) 1 and (gene or dna or protein or genetic) a  
 L295: (4) 1 and (gene or dna or protein or genetic) a  
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 (0) 1 and cluster\$3 and algorithm and user and (in

DBs: USPAT; US-PGPUB; EPD; JPO; DEF ☒ Plurals

Default operator: OR ☒ Highlight all hit terms initially

1 and (gene or dna or protein or genetic) and cluster\$4 and tree\$

|                                     | U                        | I | Document ID   | Issue Date | Pages | Title                                                    | Current OR | Current XRef          | Ret |
|-------------------------------------|--------------------------|---|---------------|------------|-------|----------------------------------------------------------|------------|-----------------------|-----|
| <input checked="" type="checkbox"/> | <input type="checkbox"/> |   | US 6301579 B1 | 20011009   | 46    | Method, system, and computer program product for         | 707/102    | 345/440;<br>707/104.1 |     |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> |   | US 6289353 B1 | 20010911   | 41    | Intelligent query system for automatically indexing in a | 707/102    | 707/101;<br>707/3     |     |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> |   | US 6269325 B1 | 20010731   | 13    | Visual presentation technique for data mining            | 703/2      | 345/440;<br>703/22;   |     |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> |   | US 5974412 A  | 19991026   | 43    | Intelligent query system for automatically indexing      | 707/3      | 707/10;<br>707/102    |     |





FIG. 2 shows a dendrogram produced by Neighbor Joining (NJ) analysis of binary files representing the presence and absence of 1,251 amplification products from each strain produced with six different primer combinations and the method of the present invention (tree length=960, consistency index=0.74, retention index=0.83 with 168 characters). The tree is rooted with the K-12 derivative MC 1061 as an outgroup. Among the O157:H7 strains, 1,060 of the 1,252 characters were conserved. Human isolates (H) and cattle isolates (C) have been previously described (Shere et al., Appl. Environ. Microbiol. 64:1390-1399, 1998; Gouveia et al., J. Clin. Microbiol. 36:727-733, 1998).

FIG. 3 shows a dendrogram produced by Neighbor Joining (NJ) analysis of binary files representing the presence and absence of 1,250 amplification products from each strain produced with six different primer combinations and the method of the present invention (tree length=1398, consistency index=0.61, retention index=0.81 with 235 characters. Among the O157:H7 strains, 892 of the 1,250 bands were conserved. The tree is rooted using the K-12 derivative MC 1061 as an outgroup. The state from which each strain originated is indicated by the two letter abbreviation in parentheses. Human isolates have an H at the end of the designation and bovine isolates are in bold.

#### DETAILED DESCRIPTION:

##### DETAILED DESCRIPTION OF SPECIFIC EMBODIMENTS

All publications, patents, patent applications or other references cited in this application are herein incorporated by reference in their entirety as if each individual publication, patent, patent application or reference were specifically and individually indicated to be incorporated by reference.

As used herein, the term "oligonucleotide" means a molecule consisting of at least two deoxyribonucleotides or ribonucleotides joined by phosphodiester bonds.

As used herein the term "primer" or "oligonucleotide primer" means an oligonucleotide, either naturally occurring as in a purified restriction enzyme digest or produced synthetically, that under the proper conditions, is capable

5,628,466 B1  
Sep. 4, 2001

#### ABSTRACT

US 6,284,466 B1  
Length: 10,000 characters  
1, p. 314.

Sequence of Nucleotide  
Genes of Escherichia coli

Method: A New Method  
Proc. Natl. Acad. Sci. USA

is amplified by arbitrary  
primers, Nucleic Acid  
Acid

Whole Chromosome Pairs  
Genome Microarrays  
1997

Text page

Article  
Genetic Polymers, Leaves

T

Gen of polynucleotides to  
whole chromosomes. DNA  
is amplified by the poly-  
merase chain reaction (PCR)  
method. The products  
indicate the identification  
of an organism. The  
method is used to  
determine the presence  
of a specific sequence. The  
method has been adapted  
to various genetic  
microarrays.

in these

Details Text Image HTML FULL



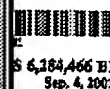
The method of the present invention has practical applications, including, but not limited to genetic mapping; determination of changes in expression patterns; the distinguishing and identification of the species, strain or serotype of organisms; and the identification of individuals?

Polymorphisms detected by the method of the present invention can be used to construct genetic linkage maps. For example, the presence or absence of amplification products obtained from samples from different organisms can be used to produce binary files. Phylogenetic relationships based on the pattern of amplification products obtained can be assessed through the maximum parsimony method and dendrograms generated by Neighbor Joining (NJ) analysis (Saitou et al., Mol. Biol. Evol. 4:406-425, 1987). Thus, the present invention provides an improved method for the determination of evolutionary changes between related organisms. The present invention can also be used to identify nucleic acid segments involved in conferring pathogenicity, environmental fitness or economically important traits.

Further, the method of the present invention can be used to identify the species, strain or serotype of organisms such as bacteria. Using the method of the present invention, a data base can be constructed based on the pattern of amplification products characteristic of known species, strains or serotypes. The pattern of amplification products obtained from an unknown organism using the present invention can be compared to the patterns in the data base, thereby allowing identification of the organism.

The present invention can also be used for the identification of individuals. Using the method of the present invention, a data base can be constructed containing the pattern of amplification products of individuals. The pattern of amplification products obtained from an unknown individual using the present invention can be compared to the patterns in the data base, thereby allowing identification of the individual.

The present invention is also useful for differential display analysis for the identification of genes by their expression patterns. Using the method of the present invention, amplification products can be produced from DNA prepared by reverse transcription of RNA extracted from two groups of organisms that



US 6,284,466 B1  
Sep. 4, 2001

#### NOTES

US 6,284,466 B1

Genetic Linkage Maps by

Length Polymorphisms

1, p. 311

Reference of Zerkowich

et al. at Eastern

Method A New Method

Proc. Natl. Acad. Sci.

as described by arbitrary

markers, Number Acid

1983

Male Chromosome Patern

erose Alterations

200

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Table

Genetic Polym. Levels

1

Gen of polymorphism to

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is amplified by the poly-

merase based on strand

extension and difference

amplification products

used for the identification

with an arbitrary of an

arbitrary sequence to

determination of poly-

merase products. The

sequence has undergone

a mutation at each site

single nucleotide

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## Determination of Genetic Relationships

Organisms from within a limited geographic region. Studies on a characterized strain set derived from dairy cattle and humans within a three-county region of Wisconsin were conducted. Human isolates in this set were derived from sporadic cases (FRIK 523 through FRIK 579) and an outbreak of hemorrhagic colitis at a daycare center (FRIK 583 through FRIK 856) that occurred during 1994 (Gouveia et al., J. Clin. Microbiol. 36:727-733, 1998). Cattle isolates (FRIK 920 through FRIK 1641) were derived from a 1995-1996 longitudinal study of three dairy cattle farms in this same region (Shere et al., Appl. Environ. Microbiol. 64:1390-1399, 1998).

Analysis using the method of the present invention was performed on each isolate using the six different primer combinations described above. Binary files were created in Microsoft Excel 97.RTM. from printed copies of the images produced by an Alden 9315CTP photographic quality thermal printer (Alden Electronics, Inc., Westborough, Mass.). The files were generated from the presence/absence of bands (FIG. 1) between 200-1500 bases in length and binary files from each primer pair were combined head to tail in Microsoft Word 97.RTM.. Phylogenetic relationships based on the amplification products were assessed through maximum parsimony methods in PAUP V.4.0 (Swofford, PAUP version 4, Sinauer Associates, Sunderland, Mass.) and by Neighbor Joining (NJ) analysis (Saitou et al., Mol. Biol. Evol. 4:406-425, 1987), both of which yielded similar results. The E. coli K-12 strain MC1061, which is phylogenetically distant from E. coli O157:H7 was included in each analysis as an outgroup to assess the ancestral state of the characters as described (Boerlin et al., Infect. Immun. 66:2553-2561, 1998). The O157:H7 strain ATCC43895 (EDL933) was included as a standard O157:H7 strain.

Of 1,251 amplification products scored from this strain set, 191 segments were variable among the O157:H7 strains, indicating that within this limited geographic region, a considerable amount of genomic diversity can be observed by the method of the present invention. Of these variable segments, 140 were parsimony-informative.

A dendrogram obtained by NJ analysis (FIG. 2) demonstrated that the strains

6,284,466 B1  
Sep. 4, 2001

## NOTES

US 6,284,466 B1

Genetic Linkage Map to  
Length Polymorphism  
in E. coli  
Sequence of Enterohemorrhagic  
Escherichia coli

Method: A Five-Method  
Peak Mol. Biol. Anal.

as described by primary  
sequence Number Anal  
MSF1  
Total Chromosome Pair-  
wise Interconnection  
COP

not page

Genetic  
Mapping From Linkage

For of polymorphism to  
make difference DNA  
is analyzed by the poly-  
merase chain reaction (PCR)  
method. The products  
are then analyzed by gel  
electrophoresis. The  
determination of poly-  
merase chain reaction (PCR)  
products has widespread  
application in molecular  
biology.

as shown

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☒ L15: (0) high adj2 dimensional adj2 vector and surfac  
☒ L22: (16) high adj2 dimensional adj2 vector and detai  
☒ L29: (0) 8 and 34/\$.cccls.  
☒ L36: (1) 8 and 345/\$.cccls.  
☒ L43: (18) 8 and centroids  
☒ L50: (28) 8 and clusters  
☒ L57: (16) 43 and 50

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 43 and 50

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|    | U                                   | 1                                   | Document ID  | Issue Date | Pages | Title                                                  | Current OR | Current XRef         | Re |
|----|-------------------------------------|-------------------------------------|--------------|------------|-------|--------------------------------------------------------|------------|----------------------|----|
| 7  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | US 6134532 A | 20001017   | 41    | System and method for optimal adaptive matching of     | 705/14     | 705/1;<br>705/26     |    |
| 8  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | US 6122628 A | 20000919   | 34    | Multidimensional data clustering and dimension         | 707/5      | 707/2;<br>707/3      |    |
| 9  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | US 6035057 A | 20000307   | 43    | Hierarchical data matrix pattern recognition and       | 382/159    | 382/155;<br>382/156  |    |
| 10 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | US 5794178 A | 19980811   | 45    | Visualization of information using graphical           | 704/9      | 345/440;<br>345/839; |    |
| 11 | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | US 5789726 A | 19980804   | 16    | Method and apparatus for enhanced transaction card     | 235/380    | 382/220              |    |
| 12 | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | US 5675819 A | 19971007   | 29    | Document information retrieval using global word       | 704/10     | 704/9;<br>707/3;     |    |
| 13 | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | US 5619709 A | 19970408   | 45    | System and method of context vector generation and     | 707/532    | 704/9;<br>707/2      |    |
| 14 | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | US 5325298 A | 19940628   | 23    | Methods for generating or revising context vectors for | 704/9      | 707/5                |    |
| 15 | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | US 5317507 A | 19940531   | 21    | Method for document retrieval and for word sense       | 707/532    |                      |    |
| 16 | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | US 6298174 B | 20011002   | 10    | Document content and context determination and display |            |                      |    |

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☒ L22: (16) high adj2 dimensional adj2 vector and detai  
☒ L29: (0) 8 and 34/\$.ccls.  
☒ L36: (1) 8 and 345/\$.ccls.  
☒ L43: (18) 8 and centroids  
☒ L50: (28) 8 and clusters  
☒ L57: (16) 43 and 50

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|----|-------------------------------------|-------------------------------------|---------------|------------|-------|--------------------------------------------------------|------------|----------------------|----|
| 1  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | US 6298174 B1 | 20011002   | 10    | Three-dimensional display of document set              | 382/305    | 358/403;<br>707/1    |    |
| 2  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | US 6278799 B1 | 20010821   | 44    | Hierarchical data matrix pattern recognition system    | 382/159    | 382/155;<br>382/156; |    |
| 3  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | US 6208752 B1 | 20010327   | 25    | System for eliminating or reducing exemplar effects in | 382/155    | 382/191              |    |
| 4  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | US 6189002 B1 | 20010213   | 16    | Process and system for retrieval of documents using    | 707/1      | 706/15;<br>707/5     |    |
| 5  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | US 6173275 B1 | 20010109   | 30    | Representation and retrieval of images using context   | 706/14     | 382/190;<br>382/195; |    |
| 6  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | US 6134541 A  | 20001017   | 30    | Searching multidimensional indexes using associated    | 707/2      | 707/1;<br>707/3      |    |
| 7  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | US 6134532 A  | 20001017   | 41    | System and method for optimal adaptive matching of     | 705/14     | 705/1;<br>705/26     |    |
| 8  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | US 6122628 A  | 20000919   | 34    | Multidimensional data clustering and dimension         | 707/5      | 707/2;<br>707/3      |    |
| 9  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | US 6035057 A  | 20000307   | 43    | Hierarchical data matrix pattern recognition and       | 382/159    | 382/155;<br>382/156  |    |
| 10 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | US 5794178 A  | 19980811   | 45    | Visualization of information using graphical           | 704/9      | 345/440;<br>345/839; |    |
| 11 | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | US 5789726 A  | 19980804   | 16    | Method and apparatus for                               | 235/380    | 382/220              |    |

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|----|-------------------------------------|-------------------------------------|---------------|------------|-------|------------------------------------------------------|------------|----------------------|-----|
| 1  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | US 6278799 B1 | 20010821   | 44    | Hierarchical data matrix pattern recognition system  | 382/159    | 382/155;<br>382/156; |     |
| 2  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | US 6172679 B1 | 20010109   | 39    | Visibility calculations for 3D computer graphics     | 345/421    | 345/422              |     |
| 3  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | US 6157621 A  | 20001205   | 143   | Satellite communication system                       | 370/310    | 370/394;<br>370/400; |     |
| 4  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | US 6035057 A  | 20000307   | 43    | Hierarchical data matrix pattern recognition and     | 382/159    | 382/155;<br>382/156  |     |
| 5  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | US 5914721 A  | 19990622   | 38    | Visibility calculations for 3D computer graphics     | 345/421    | 345/422              |     |
| 6  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | US 5742295 A  | 19980421   | 57    | Video special effects system with graphical operator | 345/427    | 345/650              |     |
| 7  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | US 5710700 A  | 19980120   | 19    | Optimizing functional operation in manufacturing     | 700/29     | 700/108              |     |
| 8  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | US 5691895 A  | 19971125   | 19    | Mechanism and architecture for manufacturing control | 700/29     | 700/108;<br>700/96;  |     |
| 9  | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | US 5592599 A  | 19970107   | 62    | Video special effects system with graphical operator | 345/427    | 345/649;<br>345/722  |     |
| 10 | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | US 5548705 A  | 19960820   | 21    | Wiping metaphor as a user interface for operating on | 345/863    | 345/642              |     |
| 11 | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | US 5487172 A  | 19960123   | 508   | Transform processor system having reduced processing | 712/32     | 700/8                |     |

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|----|-------------------------------------|-------------------------------------|--------------|------------|-------|------------------------------------------------------|------------|---------------------|----|
| 10 | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | US 5914721 A | 19990622   | 38    | Visibility calculations for 3D computer graphics     | 345/421    | 345/422             |    |
| 11 | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | US 5742295 A | 19980421   | 57    | Video special effects system with graphical operator | 345/427    | 345/650             |    |
| 12 | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | US 5710700 A | 19980120   | 19    | Optimizing functional operation in manufacturing     | 700/29     | 700/108             |    |
| 13 | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | US 5691895 A | 19971125   | 19    | Mechanism and architecture for manufacturing control | 700/29     | 700/108;<br>700/96; |    |
| 14 | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | US 5687737 A | 19971118   | 29    | Computerized three-dimensional cardiac               | 600/523    | 600/509             |    |
| 15 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | US 5592599 A | 19970107   | 62    | Video special effects system with graphical operator | 345/427    | 345/649;<br>345/722 |    |
| 16 | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | US 5572125 A | 19961105   | 44    | Correction and automated analysis of spectral and    | 324/307    | 324/309             |    |
| 17 | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | US 5548705 A | 19960820   | 21    | Wiping metaphor as a user interface for operating on | 345/863    | 345/642             |    |
| 18 | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | US 5519618 A | 19960521   | 76    | Airport surface safety logic                         | 701/120    | 701/301             |    |
| 19 | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | US 5487172 A | 19960123   | 508   | Transform processor system having reduced processing | 712/32     | 700/8               |    |
| 20 | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | US 5374932 A | 19941220   | 78    | Airport surface surveillance system                  | 342/36     | 342/29;<br>342/39;  |    |
| 21 | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | US 5198977 A | 19930330   | 47    | System and method for localization of functional     | 382/128    | 356/40;<br>382/162; |    |

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|----|-------------------------------------|--------------------------|---------------|------------|-------|------------------------------------------------------|------------|--------------------------|---|
| 1  | <input checked="" type="checkbox"/> | <input type="checkbox"/> | US 6278799 B1 | 20010821   | 44    | Hierarchical data matrix pattern recognition system  | 382/159    | 382/155;<br>382/156;     |   |
| 2  | <input checked="" type="checkbox"/> | <input type="checkbox"/> | US 6230048 B1 | 20010508   | 26    | Pictorial-display electrocardiographic               | 600/523    |                          |   |
| 3  | <input checked="" type="checkbox"/> | <input type="checkbox"/> | US 6172679 B1 | 20010109   | 39    | Visibility calculations for 3D computer graphics     | 345/421    | 345/422                  |   |
| 4  | <input checked="" type="checkbox"/> | <input type="checkbox"/> | US 6157621 A  | 20001205   | 143   | Satellite communication system                       | 370/310    | 370/394;<br>370/400;     |   |
| 5  | <input checked="" type="checkbox"/> | <input type="checkbox"/> | US 6137570 A  | 20001024   | 24    | System and method for analyzing topological          | 356/237.5  | 250/559.04;<br>356/237.2 |   |
| 6  | <input checked="" type="checkbox"/> | <input type="checkbox"/> | US 6132724 A  | 20001017   | 210   | Allelic polygene diagnosis of reward deficiency      | 424/725    | 514/188;<br>514/561      |   |
| 7  | <input checked="" type="checkbox"/> | <input type="checkbox"/> | US 6077680 A  | 20000620   | 91    | ShK toxin compositions and methods of use            | 435/7.24   | 424/185.1;<br>514/12;    |   |
| 8  | <input checked="" type="checkbox"/> | <input type="checkbox"/> | US 6035057 A  | 20000307   | 43    | Hierarchical data matrix pattern recognition and     | 382/159    | 382/155;<br>382/156      |   |
| 9  | <input checked="" type="checkbox"/> | <input type="checkbox"/> | US 5986673 A  | 19991116   | 19    | Method for relational ordering and displaying        | 345/649    | 345/440;<br>345/660      |   |
| 10 | <input checked="" type="checkbox"/> | <input type="checkbox"/> | US 5914721 A  | 19990622   | 38    | Visibility calculations for 3D computer graphics     | 345/421    | 345/422                  |   |
| 11 | <input checked="" type="checkbox"/> | <input type="checkbox"/> | US 5742295 A  | 19980421   | 57    | Video special effects system with graphical operator | 345/427    | 345/650                  |   |
| 12 | <input checked="" type="checkbox"/> | <input type="checkbox"/> | US 5710700 A  | 19980120   | 19    | Optimizing functional operation in manufacturing     | 700/29     | 700/108                  |   |
| 13 | <input checked="" type="checkbox"/> | <input type="checkbox"/> | US 5601005 A  | 19971125   | 10    | Mechanism for                                        | 780/20     | 780/100                  |   |

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DEPR:

The steps to generate a single 3D surface contour map display are the same regardless of whether the display is for a static or interval map (described below), or for one frame of a dynamic (moving) display. There are differences, however, depending on whether a flat-shaded map with distinct contour boundaries or a gouraud-shaded map with gradually changing contour colors (discussed below) is produced.

DEPR:

For activation time maps, a step can be used to detect sharp discontinuities between early and late times, to avoid displaying all possible contours at such discontinuities. It may help to visualize this by thinking of there being an abrupt cliff where elevation changes sharply from a high altitude to a low one. In a topological map it may be appropriate to draw many closely spaced contour lines to represent the elevation change. For an activation time map, however, where an activation wave front contour exists, there are no intermediate times (contours) between that contour edge and the repolarized, high -time value color area it is advancing over. Thus, no intermediate contours should be drawn between the triangle vertex for an area just activated and the other vertices of that triangle which are not yet activated. This discontinuity problem is only present for activation time static maps or time-since-last activation dynamic maps; for potential distribution maps, which are analogous to topological maps, discontinuities do not exist.

DEPR:

(2) Gouraud-shaded maps. If Gouraud shading is used (Gouraud 1971), the color hues can vary across a single planar facet if the numerical values at the vertex points around the periphery of the facets fall into different color assignment ranges. Gouraud shading effectively interpolates the values across the surface of a facet and displays a smooth continuum of colors accordingly. Due to this type of shading across a single facet, there are no abrupt color discontinuities. The Silicon Graphics GTX workstation is able to perform Gouraud shading calculations using algorithms embedded in integrated circuits, without requiring additional software to be read or used, and the processing is very rapid; a Gouraud shaded surface model having thousands of facets can be

Gouraud shading can be shown in the flat-shading method at about 6 frames per second, which is adequate for most purposes, and this algorithm can be embedded in the hardware for faster displays if desired.

**DEPR:**

The static maps and interval maps described above can be rotated on the computer screen and viewed from any angle. This is an exceptionally important feature of the subject invention. Most of the prior art cardiac mapping systems only provide two-dimensional maps which cannot adequately display the data in a manner that can be quickly interpreted and understood by a surgeon or cardiologist who does not specialize in interpreting computerized. The benefits of three-dimensional mapping over two-dimensional mapping are discussed in more detail below.

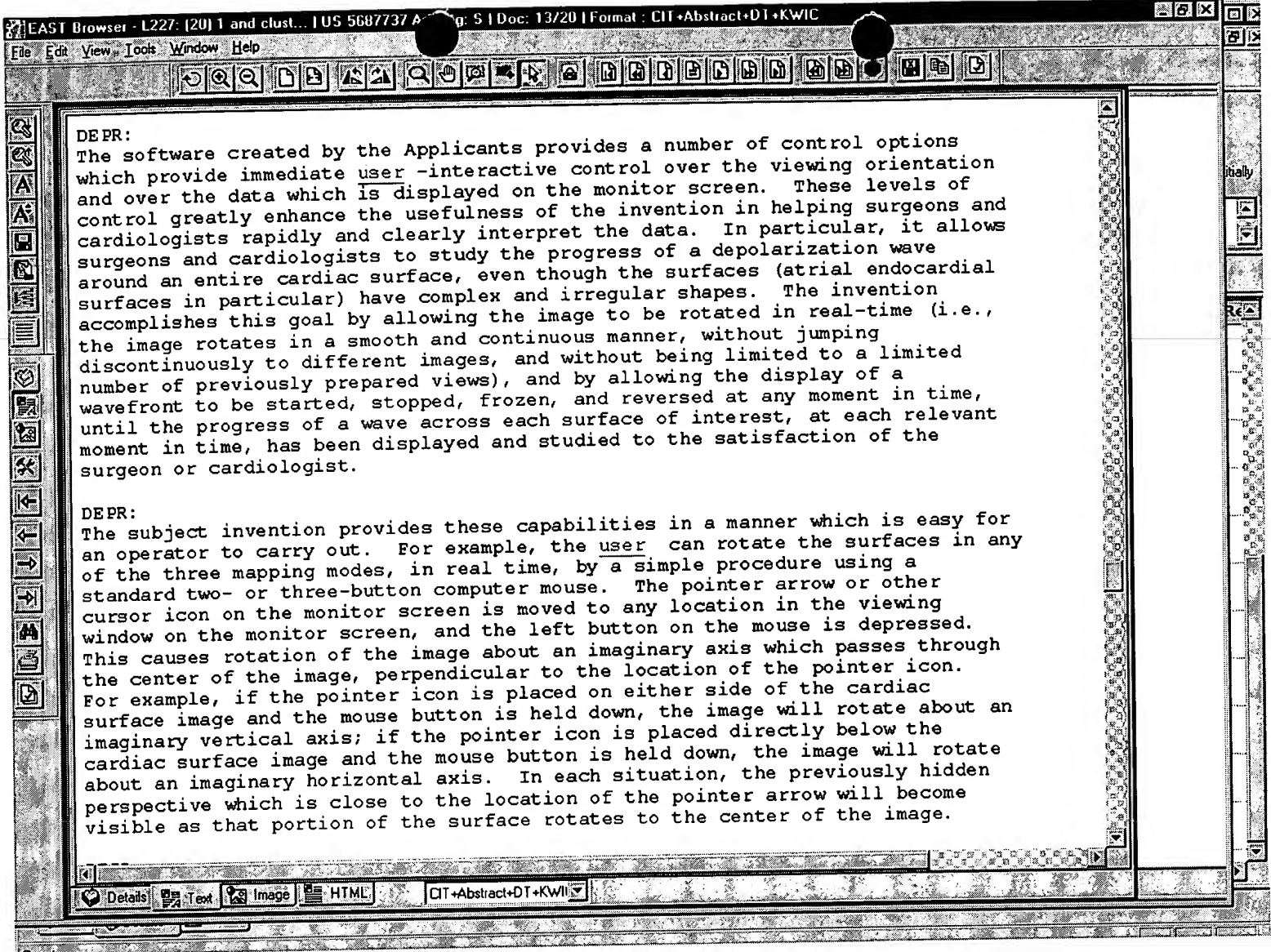
**DEPR:**

Activation time maps (ATM's) are generated as follows. The data from each electrode are analyzed to determine the activation time at each electrode; as described above, this determination will depend on whether the electrodes are unipolar or bipolar (bipolar electrodes usually measure peak voltages, while unipolar electrodes usually measure the rate of change,  $dv/dt$ ). The activation times in the various channels are used to construct a two-dimensional numerical matrix, with a row for each channel (electrode), and a number of columns equal to the number of milliseconds in the period being analyzed. A highly simplified example of an ATM array is provided in Table 1, to indicate how the data are arranged. For each channel, successive column values are set to the scale maximum, until the column corresponding to the first activation time in that channel is reached. The value in the column for that time is set to zero. Thereafter, the value in each successive column is incremented by one millisecond until the next activation time is reached. The column value is set to zero again, and the process is repeated for each activation in the channel.

**DEPR:**

For each channel, the resulting numerical matrix contains the time-since-last-activation at each millisecond. These arrays can then be displayed dynamically on the 3D surface model by assigning each vertex on the 3D model to the value of its nearest electrode at each point in time. The





DEPR:

The software created by the Applicants provides a number of control options which provide immediate user -interactive control over the viewing orientation and over the data which is displayed on the monitor screen. These levels of control greatly enhance the usefulness of the invention in helping surgeons and cardiologists rapidly and clearly interpret the data. In particular, it allows surgeons and cardiologists to study the progress of a depolarization wave around an entire cardiac surface, even though the surfaces (atrial endocardial surfaces in particular) have complex and irregular shapes. The invention accomplishes this goal by allowing the image to be rotated in real-time (i.e., the image rotates in a smooth and continuous manner, without jumping discontinuously to different images, and without being limited to a limited number of previously prepared views), and by allowing the display of a wavefront to be started, stopped, frozen, and reversed at any moment in time, until the progress of a wave across each surface of interest, at each relevant moment in time, has been displayed and studied to the satisfaction of the surgeon or cardiologist.

DEPR:

The subject invention provides these capabilities in a manner which is easy for an operator to carry out. For example, the user can rotate the surfaces in any of the three mapping modes, in real time, by a simple procedure using a standard two- or three-button computer mouse. The pointer arrow or other cursor icon on the monitor screen is moved to any location in the viewing window on the monitor screen, and the left button on the mouse is depressed. This causes rotation of the image about an imaginary axis which passes through the center of the image, perpendicular to the location of the pointer icon. For example, if the pointer icon is placed on either side of the cardiac surface image and the mouse button is held down, the image will rotate about an imaginary vertical axis; if the pointer icon is placed directly below the cardiac surface image and the mouse button is held down, the image will rotate about an imaginary horizontal axis. In each situation, the previously hidden perspective which is close to the location of the pointer arrow will become visible as that portion of the surface rotates to the center of the image.

|    | U                                   | 1                                   | Document ID   | Issue Date | Pages | Title                                                | Current OR | Current XRef         | Re |
|----|-------------------------------------|-------------------------------------|---------------|------------|-------|------------------------------------------------------|------------|----------------------|----|
| 1  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | US 6230048 B1 | 20010508   | 26    | Pictorial-display electrocardiographic               | 600/523    |                      |    |
| 2  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | US 6172679 B1 | 20010109   | 39    | Visibility calculations for 3D computer graphics     | 345/421    | 345/422              |    |
| 3  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | US 6031548 A  | 20000229   | 22    | Progressive multi-level transmission and display of  | 345/440    |                      |    |
| 4  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | US 6028608 A  | 20000222   | 66    | System and method of perception-based image          | 345/619    |                      |    |
| 5  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | US 6008820 A  | 19991228   | 71    | Processor for controlling the display of rendered    | 345/502    |                      |    |
| 6  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | US 5914721 A  | 19990622   | 38    | Visibility calculations for 3D computer graphics     | 345/421    | 345/422              |    |
| 7  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | US 5867166 A  | 19990202   | 86    | Method and system for generating images using        | 345/419    | 345/473;<br>345/629; |    |
| 8  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | US 5865832 A  | 19990202   | 22    | System for detecting, measuring and compensating     | 606/10     | 351/209;<br>606/13;  |    |
| 9  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | US 5742295 A  | 19980421   | 57    | Video special effects system with graphical operator | 345/427    | 345/650              |    |
| 10 | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | US 5735283 A  | 19980407   | 17    | Surgical keratometer system for measuring surface    | 600/558    | 351/211;<br>351/212  |    |
| 11 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | US 5687737 A  | 19971118   | 29    | Computerized three-dimensional cardiac               | 600/523    | 600/509              |    |
| 12 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | US 5592599 A  | 19970107   | 62    | Video special effects system with graphical operator | 345/427    | 345/649;<br>345/722  |    |
| 13 | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | US 5519618 A  | 19960521   | 76    | Airport surface safety logic                         | 701/120    | 701/301              |    |
| 14 | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | US 5374932 A  | 19941220   | 78    | Airport surface surveillance system                  | 342/36     | 342/29;<br>342/39;   |    |

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| 1 | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | US 6298174 B1 | 20011002   | 10    | Three-dimensional display of document set           | 382/305    | 358/403;<br>707/1    |     |
| 2 | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | US 6278799 B1 | 20010821   | 44    | Hierarchical data matrix pattern recognition system | 382/159    | 382/155;<br>382/156; |     |
| 3 | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | US 6134541 A  | 20001017   | 30    | Searching multidimensional indexes using associated | 707/2      | 707/1;<br>707/3      |     |
| 4 | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | US 6122628 A  | 20000919   | 34    | Multidimensional data clustering and dimension      | 707/5      | 707/2;<br>707/3      |     |
| 5 | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | US 6035057 A  | 20000307   | 43    | Hierarchical data matrix pattern recognition and    | 382/159    | 382/155;<br>382/156  |     |
| 6 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | US 5794178 A  | 19980811   | 45    | Visualization of information using graphical        | 704/9      | 345/440;<br>345/839; |     |
| 7 | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | US 5675819 A  | 19971007   | 29    | Document information retrieval using global word    | 704/10     | 704/9;<br>707/3;     |     |
| 8 | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | US 5619709 A  | 19970408   | 45    | System and method of context vector generation and  | 707/532    | 704/9;<br>707/2      |     |



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| 2 | <input checked="" type="checkbox"/> | <input type="checkbox"/> | US 6185561 B1 | 20010206   | 48    | Method and apparatus for providing and expression | 707/6      | 435/6                 |
| 3 | <input checked="" type="checkbox"/> | <input type="checkbox"/> | US 6074831 A  | 20000613   | 15    | Partitioning of polymorphic DNAs                  | 435/6      | 345/440;<br>435/91.1; |
| 4 | <input checked="" type="checkbox"/> | <input type="checkbox"/> | US 5841959 A  | 19981124   | 288   | Robotic interface                                 | 345/440    |                       |
| 5 | <input checked="" type="checkbox"/> | <input type="checkbox"/> | US 5841958 A  | 19981124   | 15    | Bipartite matching                                | 345/440    |                       |

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| 2 | <input checked="" type="checkbox"/> | <input type="checkbox"/> | US 6292761 B1 | 20010918   | 14    | Methods and apparatus for interpreting measured       | 702/189    | 345/440;<br>702/67;   |   |
| 3 | <input checked="" type="checkbox"/> | <input type="checkbox"/> | US 6185561 B1 | 20010206   | 48    | Method and apparatus for providing and expression     | 707/6      | 435/6                 |   |
| 4 | <input checked="" type="checkbox"/> | <input type="checkbox"/> | US 6074831 A  | 20000613   | 15    | Partitioning of polymorphic DNAs                      | 435/6      | 345/440;<br>435/91.1; |   |
| 5 | <input checked="" type="checkbox"/> | <input type="checkbox"/> | US 6020898 A  | 20000201   | 26    | Information display system for displaying time-series | 345/440    |                       |   |
| 6 | <input checked="" type="checkbox"/> | <input type="checkbox"/> | US 5841959 A  | 19981124   | 288   | Robotic interface                                     | 345/440    |                       |   |
| 7 | <input checked="" type="checkbox"/> | <input type="checkbox"/> | US 5841958 A  | 19981124   | 15    | Bipartite matching                                    | 345/440    |                       |   |
| 8 | <input checked="" type="checkbox"/> | <input type="checkbox"/> | US 5546516 A  | 19960813   | 16    | System and method for visually querying a data set    | 345/440    | 345/418;<br>345/419   |   |
| 9 | <input checked="" type="checkbox"/> | <input type="checkbox"/> | US 4920498 A  | 19900424   | 29    | Method of processing and analyzing electrophoretic    | 204/546    | 345/440;<br>345/660;  |   |

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| 1 | <input checked="" type="checkbox"/> | <input type="checkbox"/> | US 6330008 B1 | 20011211   | 64    | Apparatuses and methods for monitoring performance of    | 345/772    | 345/766;<br>345/771; |
| 2 | <input checked="" type="checkbox"/> | <input type="checkbox"/> | US 5847717 A  | 19981208   | 25    | Data synchronization between a plurality of asynchronous | 345/506    | 345/559;<br>345/582  |
| 3 | <input checked="" type="checkbox"/> | <input type="checkbox"/> | US 5790130 A  | 19980804   | 76    | Texel cache interrupt daemon for virtual memory          | 345/587    |                      |
| 4 | <input checked="" type="checkbox"/> | <input type="checkbox"/> | US 4945500 A  | 19900731   | 32    | Triangle processor for 3-D graphics display system       | 345/422    | 345/506;<br>345/519; |
| 5 | <input checked="" type="checkbox"/> | <input type="checkbox"/> | US 4885703 A  | 19891205   | 29    | 3-D graphics display system using triangle processor     | 345/422    | 345/419;<br>345/620  |

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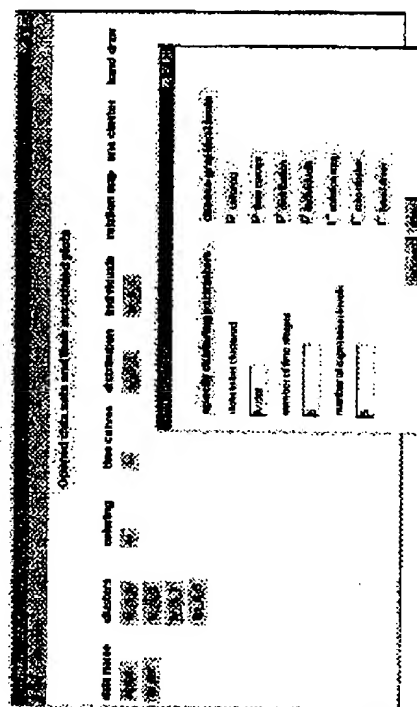
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A preferred algorithm for such a system is a clustering algorithm for, e.g., identifying functionally related genes with different time curves. In particular, the clustering algorithm may be used for clustering genes whose functional correlation involves a scale change, a time delay, a vertical flip or any combination of the three. The system

US 6,263,287 B1



**Figure 20**

Def. 64+65



## Brief Summary Text - BSTX (5):

A preferred algorithm for such a system is a clustering algorithm for, e.g., identifying functionally related genes with different time curves. In particular, the clustering algorithm may be used for clustering genes whose functional correlation involves a scale change, a time delay, a vertical flip or any combination of the three. The system preferably also includes a time-curve representation that is both literal and numerical. Literal representations assist in making SQL (Standard Query Language) type database queries. Numerical representations assist in allowing for the arithmetical transformation of curves. Such transformations are useful in differentiating tissue and disease specificity of gene expression. In addition, clustering algorithms and mathematical calculations preferably are tightly integrated with a graphical user presentation interface. Finally, graphics preferably are included to assist in navigation and analysis of the expression data in an intuitive, interactive, and iterative fashion.

## Brief Summary Text - BSTX (6):

Indeed, there is a need for improved computer-aided techniques for the analysis and manipulation of gene expression data. The

U.S. Patent

Jul. 17, 2001

Sheet 20 of 20

US 6,263,287 B1



Figure 20



Brief Summary Text - BSTX (8):

The present invention relates to systems for manipulating and analyzing gene expression data. In one embodiment, the system comprises a means for receiving gene expression data for a plurality of genes; a means for comparing the gene expression data from each of said plurality of genes to a common reference frame; a means for assigning a grid representation to each of said gene expression data from said plurality of genes; and a means for presenting said assigned grid representation. More specifically, this system further comprises means for clustering said grid representations. Still further, the grid representation may be normalized to within [-1,1]. The gene expression data for each of said plurality of genes comprises a plurality of expression levels and a plurality of associated time points.

Brief Summary Text - BSTX (9):

Clustering preferably may be grid clustering or .sigma.-.tau. clustering. The presentation step of the methods and systems of the invention preferably comprises one or more of the following for each grid representation or cluster thereof: temporal pattern of expression; file designation; gene identification number; major class; sub class; gene

*Index, table, file*  
U.S. Patent Jul. 17, 2001 Sheet 20 of 20 US 6,263,287 B1

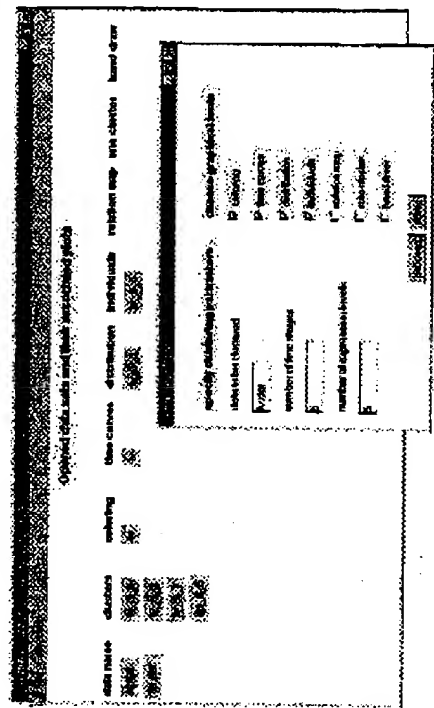


Figure 20



Clustering preferably may be grid clustering or  $\sigma$ - $\tau$  clustering. The presentation step of the methods and systems of the invention preferably comprises one or more of the following for each grid representation or cluster thereof: temporal pattern of expression; file designation; gene identification number; major class; sub class; gene description; grid representation; and time curve. This data may then be hyperlinked within said display. Further, clustered grid representations may be compared, for example, based on tissue origin or gene. The clusters themselves may be created based on, for example, gene or tissue origin.

Another embodiment of the present invention relates to a method, in a computer system, of manipulating expression data associated with a gene, comprising the steps of: inputting expression data for a plurality of genes; comparing the expression data from said plurality of genes to a common reference frame; and assigning a grid representation to said expression data based on said comparing step. Based on its assigned grid representation, the expression data may be clustered and presented by relative

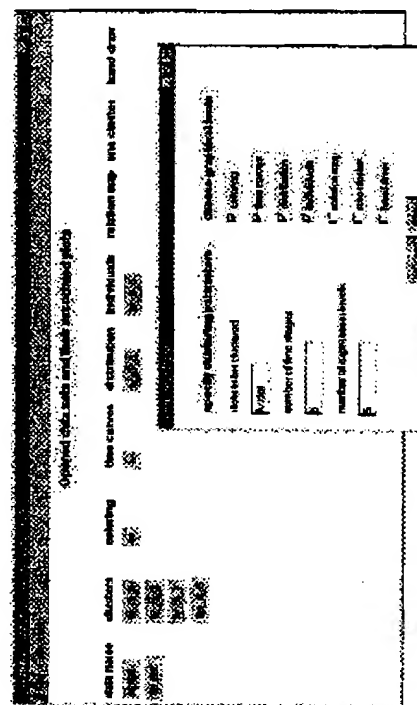


Figure 20

① Selection process of Index/File

(2) Analyzing etc. —  
hyperlinked.



## Brief Summary Text - BSTX (10):

Another embodiment of the present invention relates to a method, in a computer system, of manipulating expression data associated with a gene, comprising the steps of: inputting expression data for a plurality of genes; comparing the expression data from said plurality of genes to a common reference frame; and assigning a grid representation to said expression data based on said comparing step. Based on its assigned grid representation, the expression data may be clustered and presented by relative expression levels. The clustering may also be presented by time stage, or by both relative expression level and time stage. The grid representation preferably comprises a relative expression level component and a time stage component. The relative expression level may preferably comprise three, five, seven, nine, eleven, thirteen, or fifteen relative expression levels. The time stage may preferably comprise two, three, four, five, six, seven, eight, nine, ten, eleven, twelve, thirteen, fourteen, or fifteen time stages. Clustered expression data may be sorted by relative expression level, time stage, or by both relative expression level and time stage.

## Brief Summary Text - BSTX (11):

U.S. Patent

Jul. 17, 2001

Sheet 20 of 20

US 6,263,287 B1

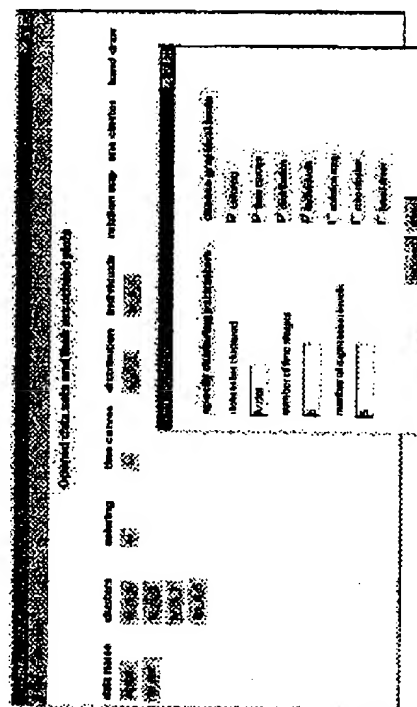


Figure 20



FIG. 5 is a flowchart of a preferred embodiment of the systems of the present invention that shows the clustering of processed GED through Grid Clustering.

Drawing Description Text - DRTX (7):

FIG. 6 is a flowchart of another preferred embodiment of the systems of the present invention that shows the clustering of processed GED through .sigma.-.tau. Clustering.

Drawing Description Text - DRTX (12):

FIG. 11 presents a screen display of the distribution of clustered genes on a grid with 5 time stages and 5 expression levels, where the geometric shape of the cluster is quantitatively described by the cluster name.

Drawing Description Text - DRTX (13):

FIG. 12 presents a screen display of a representative GUI wherein a user scrolls through individual clusters to examine the accuracy of clustering or to search for particularly shaped time curves.

Drawing Description Text - DRTX (14):

U.S. Patent

Jul. 17, 2001

Sheet 20 of 20

US 6,263,287 B1



Figure 20

FIG. 13 presents a screen display of a representative clustering for a 5-3 grid and clustering for a 5-7 grid.

Drawing Description Text - DRTX (16):

FIG. 15 presents a screen display of a representative GUI for viewing .sigma.-tau. clustering, as well as time curves for the selected gene.

Drawing Description Text - DRTX (19):

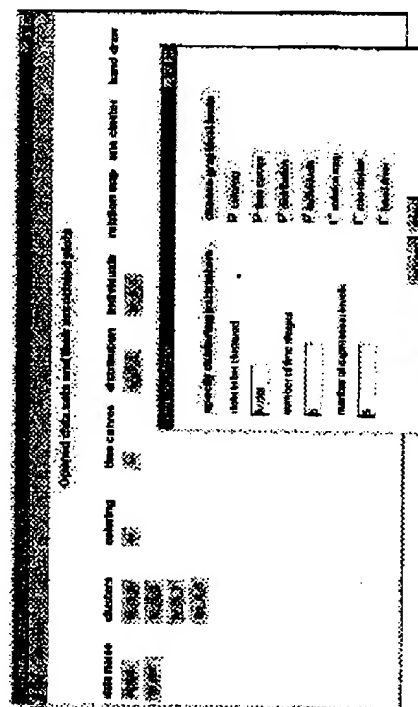
FIG. 18 presents a screen display of a representative GUI that allows side by side comparison of clustering profiles for two genes.

Drawing Description Text - DRTX (21):

FIG. 20 presents a screen display of a representative main system window, containing tools for tracking input data and associated clustered data sets. The displayed pop-up window provides a GUI wherein the user can select clustering parameters and graphical tools.

Detailed Description Text - DETX (6):

The present invention relates to a system for analyzing gene expression data.



**Figure 20**



## Detailed Description Text - DETX (52):

In this representation, the window contains scrollable panels for the text properties associated with each gene. Such properties preferably include the presentation of clone ID, major class, subclass and description. One can selectively color and mark one or any number of genes by highlighting the genes in a panel, which preferably are specified from the property selection list at the top of the window. For each gene, the color and mark symbol also may be specified from the color and symbol selection lists at the top of the window. Each highlighted time curve also may be dehighlighted by selecting the corresponding highlighted gene in the specified property scrollable panel. Indeed, any of these properties displayed on the browser may be hyperlinked.

## Detailed Description Text - DETX (53):

In a preferred embodiment, a click on the black reset button at the upper right corner serves to remove all highlights. Since the panels can be independently scrolled, a gene index column may be provided for each panel for tracking their relative positioning.

## Detailed Description Text - DETX (54):

U.S. Patent

Jul. 17, 2001

Sheet 20 of 20

US 6,263,287 B1

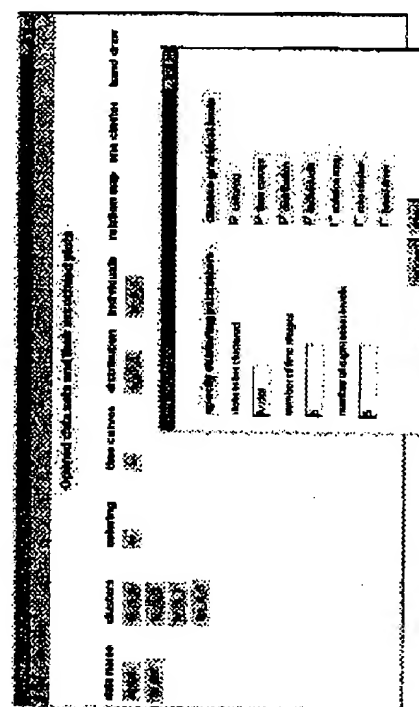
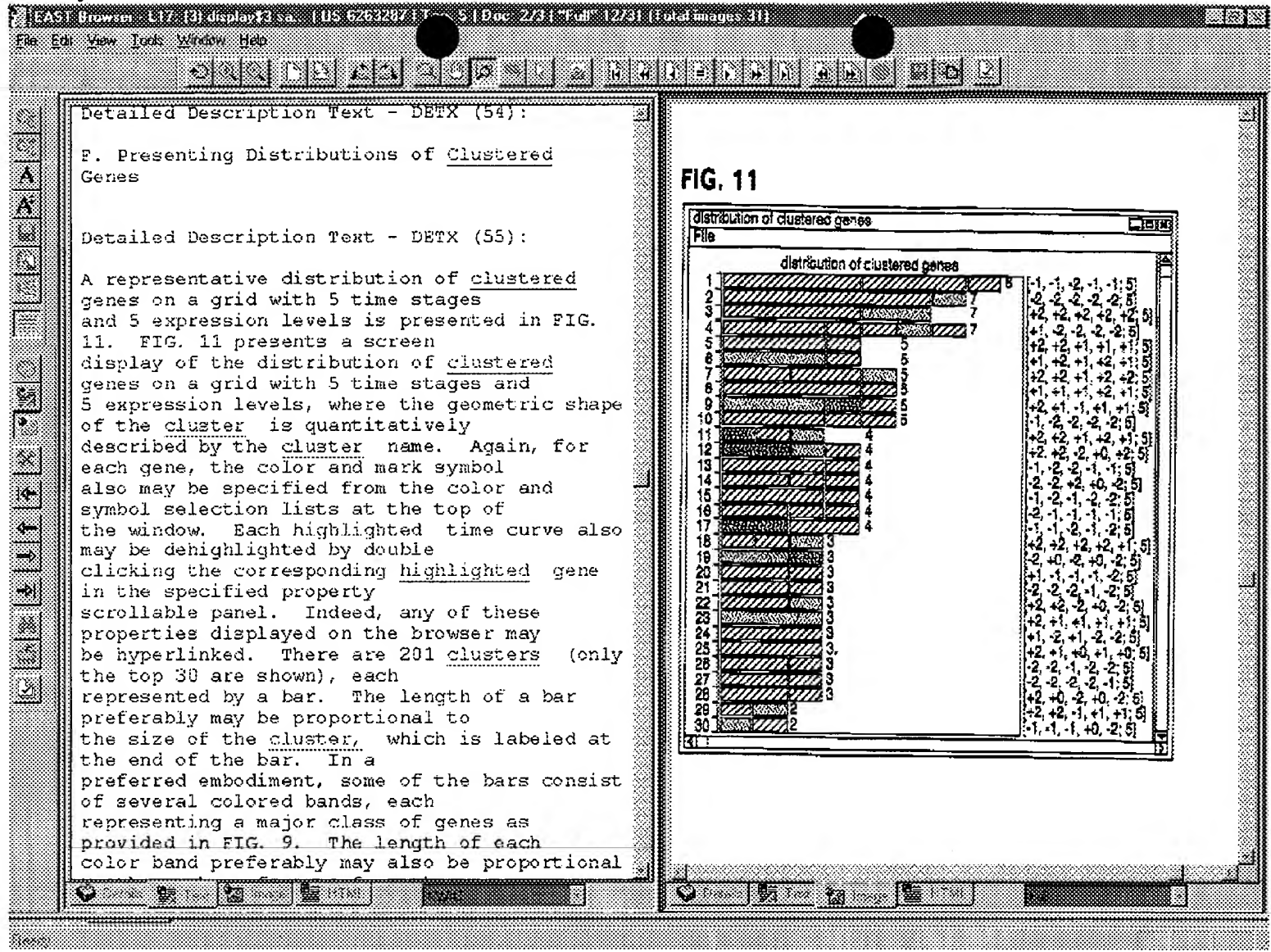


Figure 20





## Detailed Description Text - DETX (64):

Another aspect of the systems of the present invention preferably provides an interactive graphical tool for presenting .sigma.-.tau. clustering. Referring to FIG. 15, in a preferred embodiment there are text fields at the top of the window. Specifically, FIG. 15 presents a screen display of a representative GUI for viewing .sigma.-.tau. clustering, as well as time curves for the selected gene. The first three fields depicted allow one to specify a set of expression data for clustering, the maximum amplitude of the time shift and the expression level. The last field allows one to search for genes whose description property contains a specific key word. By clicking on the search for keyword button, one can re-arrange all the key word containing genes to the top of the description panel. To perform .sigma.-.tau. clustering, one chooses a reference time curve, to which other time curves are compared, by highlighting a row in the scrollable description panel.

## Detailed Description Text - DETX (65):

In a representative example of the systems of the present invention, when the rat brain natriuretic peptide gene (No. 52) is highlighted, 13 color squares of 26 genes are displayed on the .sigma.-.tau.

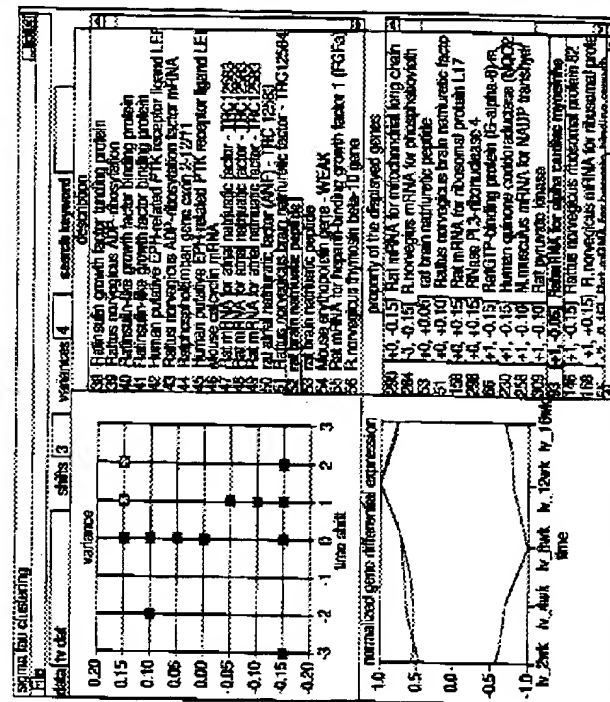


FIG. 15

# Detailed Description Text - DETX (65):

In a representative example of the systems of the present invention, when the rat brain natriuretic peptide gene (No. 52) is highlighted, 13 color squares of 26 genes are displayed on the .sigma.-.tau. plot with a shift range of 3 and variance range of 4. The squares may be colored according to their major classes, with the square at the (0, 0) grid point corresponding to the highlighted gene itself. The (.tau.,.sigma.) coordinates and description of the genes displayed in the .sigma.-.tau. plot preferably are listed in the displayed genes panel. In a preferred embodiment, by highlighting a row in the displayed genes panel, one can view the time curves in the normalized differential gene expression panel: the time curve highlighted in the description panel (e.g., pink), the time curve highlighted in the normalized differential gene expression panel (e.g., gray) and its transform (e.g., blue). FIG. 15 presents a representative .sigma.-.tau. plot after changing the shift and variance text fields. Specifically, the transform curve in FIG. 15 represents the normalized curve after a time shift and a vertical flip. The near perfect overlap of the time and transformed curves suggests a potential time-shifted negative correlation between rat brain natriuretic peptide (No. 52) and alpha cardiac myosin heavy chain (No.

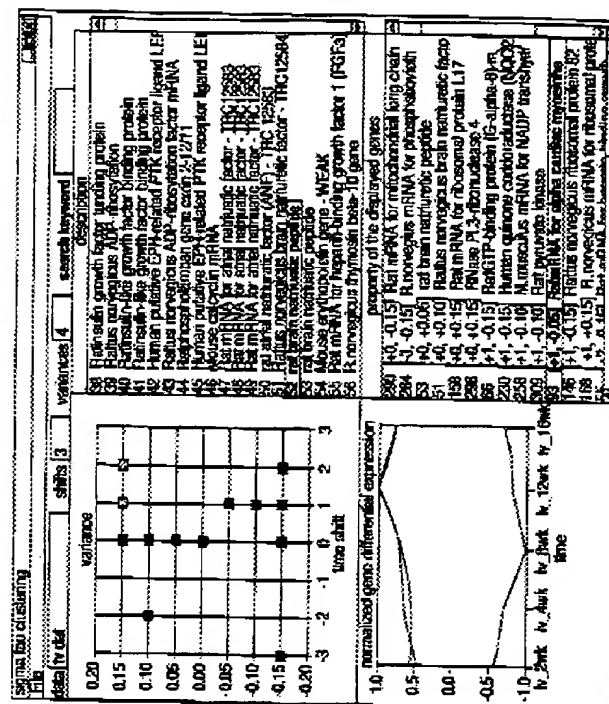


FIG. 15

graphical tools. In this particular format, there are a number of scrollable panels. For each gene, the first panel preferably displays the cluster name in the left ventricle, the septum and the difference between two clusters, whereas the remaining panels preferably display the text properties of the genes. A gene index column preferably is included in the panel to assist tracking of specific genes when the lists are independently scrolled.

#### Detailed Description Text - DETX (75):

Due to the inherent round-off error of any grid clustering, two time curves of a similar shape sometimes fall into different clusters. In such cases, it may be preferable to view the actual difference between the curves to check the accuracy or inaccuracy of clustering. This can be accomplished in this presentation format by highlighting a gene in the first panel. A pop-up window will subsequently display the two time curves: the left ventricle and septum. Multiple highlightings are preferably provided (two are shown in FIG. 19). De-highlighting the corresponding genes in the first panel can close the pop-up windows.

#### Detailed Description Text - DETX (77):

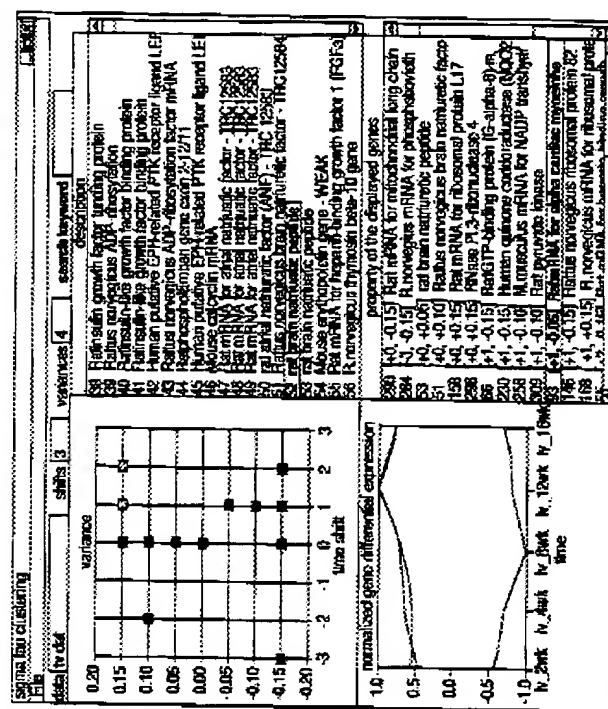


FIG. 15

Remaining locations are resized to accommodate newly-displayed contents within the defined region. The list is directly scrolled by selecting and moving locations with a pointing device. In a second, equally preferred embodiment of the invention, expansive locations are displayed as a cluster arrangement. A selected cluster is highlighted and expanded to display the next tier in the information hierarchy as a list, or as a cluster. Any previously-selected cluster is deselected and contracted. An expansive location may include a text descriptor, a test command, or a pictorial icon. Hypertext Markup Language (HTML), Email, or cached WWW page links may also be embedded within a list.

(42) Patent No. US 6,252,597 B1  
(45) Date of Patent Jun. 26, 2000

- OTHER PUBLICATIONS**
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- Longtin, J. et al. "A Reason-based Analysis of Board of Hypothesis Generation for Visualizing Image Structures" *Proc. at Human Factors in Computing Systems CHI-92, ACM, pp. 417-426, May 1992.*
- Gold, W. et al. "Synthetic Interfaces to Support Program Comprehension", *Proc. of the 4th Workshop on Program Comprehension, IEEE Comp. Soc. Press, pp. 123-132, May 1992.*

مجلسه مشاوره در ۲۸ شهریور ۱۳۸۸

Primary Examiner—Maurice A. Proulx  
Assistant Examiner—Jeffrey Albert Rios  
IT'S A SERVICE AGENCY BY FITZ—Michael A. J. J.


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(29) The invention also provides a dynamically scalable indentation scheme

(12) Patent No.: US 6,131,597 B1  
(45) Date of Patent: Jun. 26, 2001

SECRET FROTH-47-4NY

Johnson, R. et al. "Two-Stage's Space-Clustering Approach to the Visualization of Hierarchical Information Structures", Proc. Conf. on Visualization '92, IEEE Comp. Soc., 1992.

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1994.

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Assoc. Executive—Jeffrey Albert Zandi  
 CB Secretary—Angela M. Piro—Michael A. Vento

## ABSTRACT

A paginacci user interface provides a search information system. Interactive references are displayed as recommended.

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members, are considered as a single indifference. A rational

is the information necessary to a full and complete understanding of the subject.

STANLEY L. LORBER, MD, is professor and chairman of the Department of Psychiatry, University of California, San Diego, and a senior advisor to the National Institute of Mental Health.

STIMULI: BROWN ET AL. 1993

embedded within a list.

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## 28 Chapter 16 Drawing Space

2nd & 3rd clusters are generated  
The at least 3rd cluster is altered by at least hi-lifting

also be embedded within a list; and a list may be embedded within a cluster.

(28) An expansive location may include a text descriptor, a text command, or a pictorial icon. Hypertext Markup Language (HTML) links or cached World Wide Web (WWW) pages may also be embedded within a cluster or list.

(29) The invention also provides a dynamically scalable indentation scheme that displays deeper levels of a hierarchy with greater indentation and higher levels of the hierarchy with less indentation.

#### BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a computer system according to the prior art;

FIG. 2 is a front view of a computer display showing a text menu according to the prior art;

FIG. 3 is a front view of a computer display showing pictorial icons according to the prior art;

FIG. 4 is a front view of a computer display showing a first tier of a graphical user interface having a scalable file structure according to a first preferred embodiment of the invention;

#### United States Patent Loings

Patent No. US 6,452,597 B1  
(s) Date of Patent: Jun. 26, 2001

#### (54) SCALABLE USER INTERFACE FOR GRAPHICALLY REPRESENTING HIERARCHICAL DATA

(72) Inventor: Mercedes Lopez, Modesto, Calif., CA (US)

(73) Assignee: Message Communications Corporation, Modesto, Calif., CA (US)

(\*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) App. No.: 08/008,802

(22) Filed: Feb. 14, 1997

(23) Int. Cl. G06F 15/00; G06F 15/02

(24) U.S. Cl. 395/200; 395/201

(25) Field of Search: 395/200, 395/201

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## (1) DETAILED DESCRIPTION OF THE INVENTION

(2) The invention provides a graphical user interface (GUI) having a scalable display for showing information, commands, and/or file structures substantially in their entirety. In the invention, interactive categories within lists or clusters are displayed as expansive locations on a computer display of a computer system. Such locations are expanded or compressed upon respective selection or deselection to permit the user to view subcategory information, as well as higher level information. The list may be directly scrolled by selecting a category with a pointing device and by dragging the list to the desired location, for example using drag and drop techniques.

(3) The exemplary embodiment of the invention is considered to be only one of several different display formats in which the invention may be implemented. Thus, the invention can be readily implemented by one skilled in the art in any desired display format, such as Java, html, and C++. The actual generation of the GUI display can be performed using well-known hardware and software techniques.

(4) FIGS. 4 through 8 sequentially show the operation of a first preferred embodiment of the invention. FIG. 4 provides

(33) United States Patent  
Lokuge
 (33) Patent No.: US 6,452,597 B1  
 (33) Date of Patent: Jun. 26, 2001
(34) SCALABLE USER INTERFACE FOR  
GRAPHICALLY REPRESENTING  
HIERARCHICAL DATA

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(36) Assignee: Netscape Communications Corporation, Modesto, Calif., U.S.

(37) Name: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days

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(42) Field of Search: 709/203, 709/207

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| 4,970,254 | 1990/06/28 | Ranking of a... | 709/203 |
| 4,970,255 | 1          |                 |         |



(27) A cluster includes one or more categories, each occupying an expansive location. The categories within an individual cluster are preferably related. For example, the cluster 82 assigned the name "people" shown in FIG. 8 includes pictorial icons 84 representing embedded Email links to co-workers. A cluster is assigned an identifying text descriptor, is represented by a pictorial icon, or both.

(28) When a category within the cluster is selected, its location expands to display the next tier in the information hierarchy. This next tier is displayed as another cluster, or as a list according to the first embodiment of the invention. Similarly, a list may open to display another list or a cluster. In the preferred embodiment of the invention, a cluster is moved on the desktop when it is dragged by a pointer to the desired location.

(29) A desktop display may include a plurality of clusters. In the preferred embodiment of the invention, the display includes an animation module to permit cluster resizing, such as expanding and contracting. Thus, a selected cluster is highlighted and expanded to occupy a larger area on the desktop. Any previously-selected cluster is deselected and contracted. A selected cluster may also be relocated to a more prominent

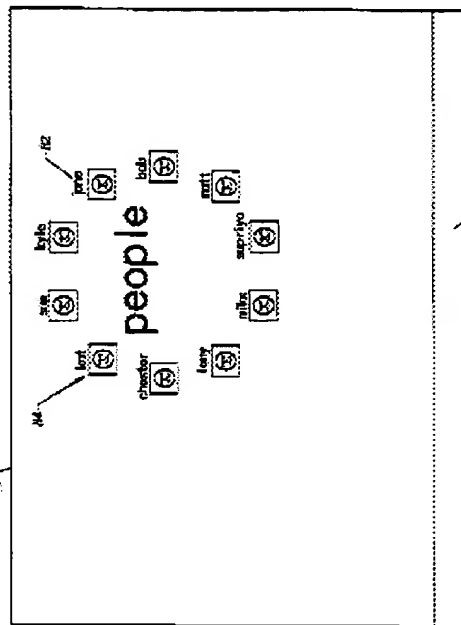
U.S. Patent

Jun. 16, 2001

Sheet 8 of 16

US 6,252,597 B1

FIG. 8



• another expanded clustering



(29) A desktop display may include a plurality of clusters. In the preferred embodiment of the invention, the display includes an animation module to permit cluster resizing, such as expanding and contracting. Thus, a selected cluster is highlighted and expanded to occupy a larger area on the desktop. Any previously-selected cluster is deselected and contracted. A selected cluster may also be relocated to a more prominent position on the desktop, such as the center of the desktop; while unselected clusters may be relocated to less prominent positions on the desktop, e.g. the periphery of the desktop.

(30) In alternate embodiments of the invention, a selected cluster is highlighted only, expanded only, or is indicated by other means, such as sound or animation. However, the invention may be adapted to permit a plurality of clusters to be selected and expanded at the same time.

(31) While the clusters shown in FIG. 8 are circular, one skilled in the art will readily appreciate that a cluster may take any desired shape. In one embodiment of the invention, the cluster shape is user defined. The user selects the shape, dimensions, or contents of the cluster as desired. In another embodiment of the invention, the shape of the cluster is pre-defined by the system software. Similarly, the

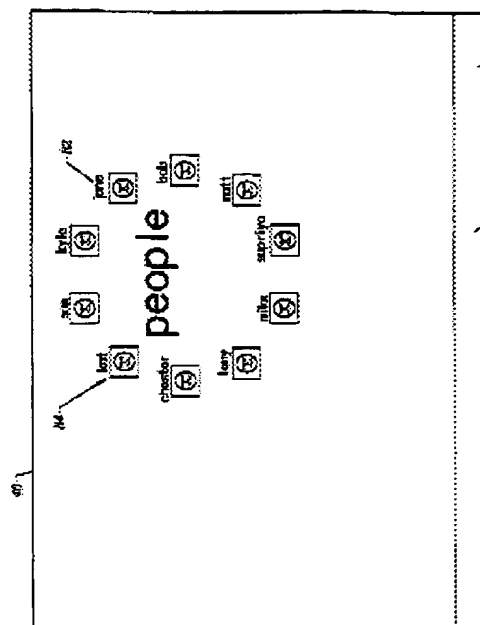
U.S. Patent

Jun. 16, 2001

Sheet 8 of 16

US 6,252,597 B1

FIG. 8



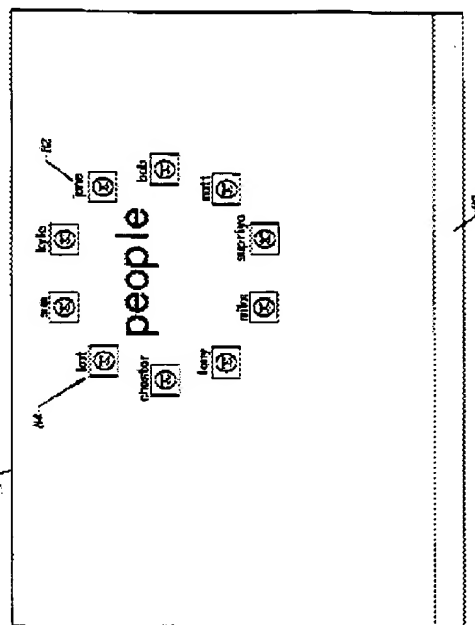


(33) Hyperlinks may be embedded in the preview. A user may thereby directly connect to a particular www page. This embodiment is advantageous as it permits the user to connect a desired link quickly without first having to connect to the Internet and load the www page.

Jan. 26, 2001

Sheet 8 of 16

US 6,252,597 B1



21

wherein the term linear means in a vertical or horizontal direction on said display, and expansion and compression is performed hyperbolically.

at least a second expansive location,  
wherein said second expansive location  
is compressed in response to the selection of  
said first expansive location.

19. The structure of claim 16, wherein said scalable information structure comprises a cluster .

29. The structure of claim 19, wherein animation is used to contract a second cluster display and enlarge said first cluster display upon highlighting or selection of said first cluster .

21. The structure of claim 20, wherein said first cluster is moved to a central portion of said display screen upon selection.

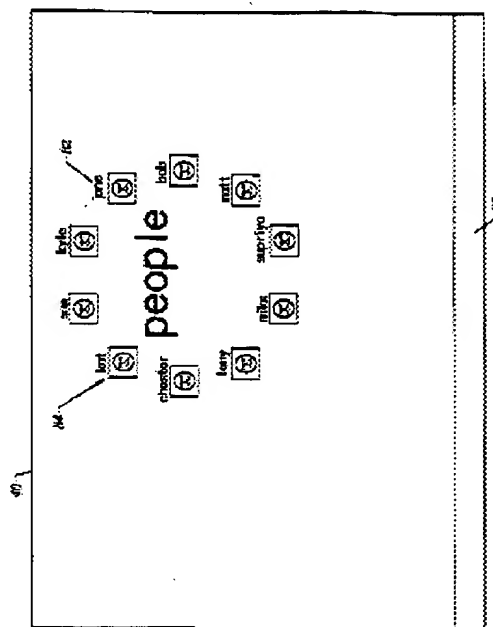
22. The structure of claim 16, wherein a pointing device is used within said defined region to directly select said

Jan. 26, 2001

Sheet 8 of 16

US 6,252,997 B1

8.31.8





3. The apparatus of claim 1, wherein said scalable information structure comprises a list.

4. The apparatus of claim 1, wherein said scalable information structure comprises at least a first cluster.

5. The apparatus of claim 4, further comprising:

at least a second cluster, wherein, upon highlighting or selection of said first cluster, said second cluster display is contracted and said first cluster is enlarged.

6. The apparatus of claim 4, further comprising:

at least a second cluster, wherein, upon highlighting or selection of said first cluster, said first cluster is moved to a central portion of said display screen.

7. The apparatus of claim 1, wherein a pointing device is used to select said expansive location at a first location within said defined region, and to drag said expansive device to a second location.

8. The apparatus of claim 3, wherein the contents of said expansive location comprise a cluster.

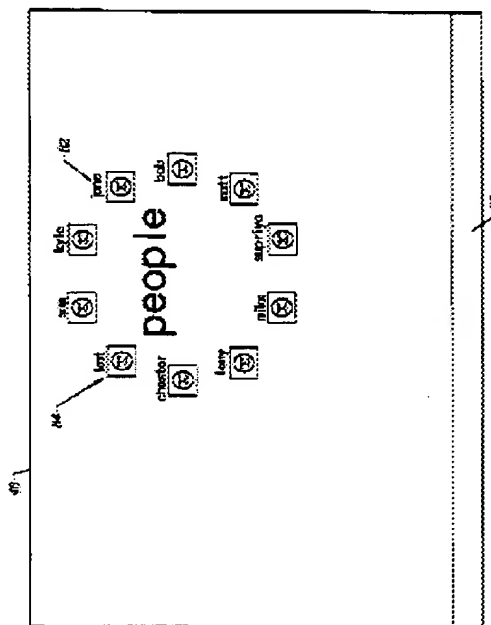
U.S. Patent

Jan. 24, 2001

Sheet 8 of 16

US 6,252,597 B1

FIG. 8



File View Edit Tools Windows Help

USPAT. US. PG. PUB. EPO. JPO. DER. WENT. IBM. IDB

Default operator: OR

Display\$3 and cluster\$3 and hot adj spot\$1  
 same highlight\$3 and interactive\$2

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DBS form IS&R form Image Text HTML

|   | U | 1 | Document ID  | Issue Date | Pages | Title                                                                                     | Current OR | Current XRe | Re |
|---|---|---|--------------|------------|-------|-------------------------------------------------------------------------------------------|------------|-------------|----|
| 1 |   |   | US 5870700 A | 19990209   | 47    | System for converting existing TV content to an interactive media content for interactive | 725/112    | 345/4101    |    |
| 2 |   |   | US 5870700 A | 19990209   | 47    | Expert system and method employing hierarchical knowledge                                 | 725/112    | 345/4101    |    |
| 3 |   |   | US 5870700 A | 19990209   | 47    | Expert system and method employing hierarchical knowledge                                 | 725/112    | 345/4101    |    |
| 4 |   |   | US 5870700 A | 19990209   | 47    | Expert system and method employing hierarchical knowledge                                 | 725/112    | 345/4101    |    |
| 5 |   |   | US 5870700 A | 19990209   | 47    | Expert system and method employing hierarchical knowledge                                 | 725/112    | 345/4101    |    |
| 6 |   |   | US 5870700 A | 19990209   | 47    | Expert system and method employing hierarchical knowledge                                 | 725/112    | 345/4101    |    |
| 7 |   |   | US 5870700 A | 19990209   | 47    | Expert system and method employing hierarchical knowledge                                 | 725/112    | 345/4101    |    |
| 8 |   |   | US 5870700 A | 19990209   | 47    | Expert system and method employing hierarchical knowledge                                 | 725/112    | 345/4101    |    |

Hit Details HTML

NUM

#2 - 15, 31, 51 (sections) clustering for an object in motion  
 segmentation & clustering techniques (not claimed)  
 segments

#3 - 164 hotpotting a link a word etc. -

6243287 Detx 64 + Detx 65